Claims

1. A method for repairing a protective lining of an industrial reaction or transport vessel including the steps of identifying combined areas of the lining having a thickness below a pre-determined threshold value by means of a measuring device, which measuring device measures the residual thickness of the lining and a processing unit, which processing unit in a first step transforms the residual thickness data into binary data, by comparing the measured residual thickness data with the pre-determined threshold value for the thickness of the lining, and assigning the binary value "1" to areas of the lining having a thickness below the pre-determined threshold value, and the binary value "0" to areas of the lining having a thickness equal or higher than the pre-determined threshold value, or vice versa, in a second step combines isolated areas of the lining having a thickness below the pre-determined threshold value into combined areas of the lining to which the binary value for areas of the lining having a thickness below the pre-determined threshold value is assigned, and in a third step computes the position and repair sequence of each of the combined areas and transfers these data to a repair device, and applying monolithic lining material onto the combined areas computed by the processing unit by means of a repair device.

2. The method of claim 1, wherein the protective lining is a refractory lining.

3. The method of any one claims 1 or 2, wherein the industrial reaction or transport vessel is a metallurgical vessel.

4. The method of claim 3, wherein the metallurgical vessel is selected from a converter vessel, an electric arc furnace, a blast furnace, a ladle, a tundish and a coke oven chamber.

5. The method of claim 4, wherein the ladle is selected from a steel casting ladle, pig iron ladle, torpedo ladle and slag ladle.

6. The method of any one of the preceding claims, wherein the measuring device is a laser-based measuring device.

7. The method of claim 6, wherein the laser-based measuring device is a mirror scanner.

8. The method of any one of the preceding claims, wherein the repair device comprises a manipulator arm and a gunning nozzle which is disposed thereon and is rotatable, tiltable and vertically movable.

9. The method of any one of the preceding claims, wherein the repair device is selected from a spraying, a gunning and a shotcreting device.

10. The method of any one of the preceding claims, wherein the processing unit is electronically connected with the measuring device and the repair device.

11. The method of any one of the preceding claims, wherein steps within the processing unit are carried out electronically.

12. The method of any one of the preceding claims, wherein the processing unit combines the isolated spots into rectangular combined areas.

13. The method of any one of the preceding claims, wherein the position of each of the combined areas are computed in the form of cyclinder coordinates.

14. The method of any one of the preceding claims, wherein the residual thickness of the refractory lining is once again measured by the measuring device, after completion of the repair step and the thus obtained residual thickness data are compared with data obtained by a simulation regarding the achievable reconstitution of the refractory lining, and in case of a deviation between the newly measured residual thickness data and the simulation data, the control unit of the repair device is calibrated accordingly.

15. The method of any one of the preceding claims, wherein the residual thickness of the refractory lining is once again measured by the measuring device, after completion of the repair step and the thus obtained residual thickness data are compared with data obtained by a simulation regarding the achievable reconstitution of the refractory lining, and in case of a deviation between the newly measured residual thickness data and the simulation data, the processing and repair sequence is repeated.